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17 April 1963

MEMORANDUM FOR: Assistant for Plans and Development

THROUGH: Executive Secretary, TDC

SUBJECT: Staff Study - Mark II Multiple Image Correlator

1. PROBLEM:

To construct the Mark II Multiple Image Correlator to improve the operational capabilities of the NPIC in the general field of image enhancement by the reduction of inherent grain "noise" existing in those film inputs which are focal length limited or grain limited in which there is more than one record of the same image.

2. DISCUSSION:

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25X1A Under contract number [redacted] Task 4 the firm of [redacted] designed and fabricated a Multiple Image Correlator prototype instrument which was so spectacularly successful in the area of image enhancement that a subsequent contract was let with the same firm to conduct a test and evaluation program with that instrument. This program is presently scheduled for completion in June of this year. Concurrently with the test and evaluation program, a contract was let to design a production instrument to be designated M.I.C. Mark II. This program is also scheduled for completion in June and is sufficiently far along to consider the letting of a contract to construct this instrument. Attached is the

25X1A [redacted] proposal with pricing as solicited.

3. FACTS:

The attached samples demonstrate very clearly the degree of image enhancement achieved through the medium of multiple image correlation. Several existing input systems provide more than one record of the same image and so are compatible with the technique. Several proposed input systems will provide multiple image records. It is further suggested that the technique of multiple image correlation will be employed to enhance the quality of standard and high speed cinema photographic

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records, and further that the myriad of still camera records obtained for intelligence purposes will lend themselves to multiple image correlation. An experimental system of spacial filtering of a single photographic record results in a number of records, each with its own power spectrum, and these might well be re-combined through the medium of multiple image correlation techniques to produce a result far superior to the original record.

The prototype instrument, while operational to the extent of demonstrating the feasibility of multiple image correlation, will not lend itself to production techniques. This is precisely why the contract for the Mark II study was initiated. The proposal for the fabrication of the Mark II clearly indicates that [redacted] is aware of those human engineering aspects required in an operational instrument. It should be noted also that the circular film chip is no longer required having been replaced by a roll film handling capability which alleviates the former objection of destroying the original record. In addition, the exterior orientation motions are servo motorized rather than manual. The magnification has been extended so that it is continuously variable from 20X to 30X. Used as a single stage, it might well be regarded as a high quality precision enlarger within that magnification range. It is estimated that the time required for a complete set-up of eight stages has been reduced from three hours with the Mark I to less than thirty minutes with the Mark II. The registration accuracy has been improved to a point which is compatible with the average grain size of high resolution emulsions.

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4. CONCLUSIONS:

Since the NPIC has pioneered the instrumentation in this particular field of image enhancement, it seems appropriate that we should continue this work to its logical conclusion which is the fabrication of a production instrument. It also seems appropriate that since the firm of [redacted] designed and built the prototype instrument, conducted the test and evaluation program, and have designed the Mark II production model instrument that they be selected by the TDC to begin immediately the fabrication of that instrument.

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5. RECOMMENDATIONS:

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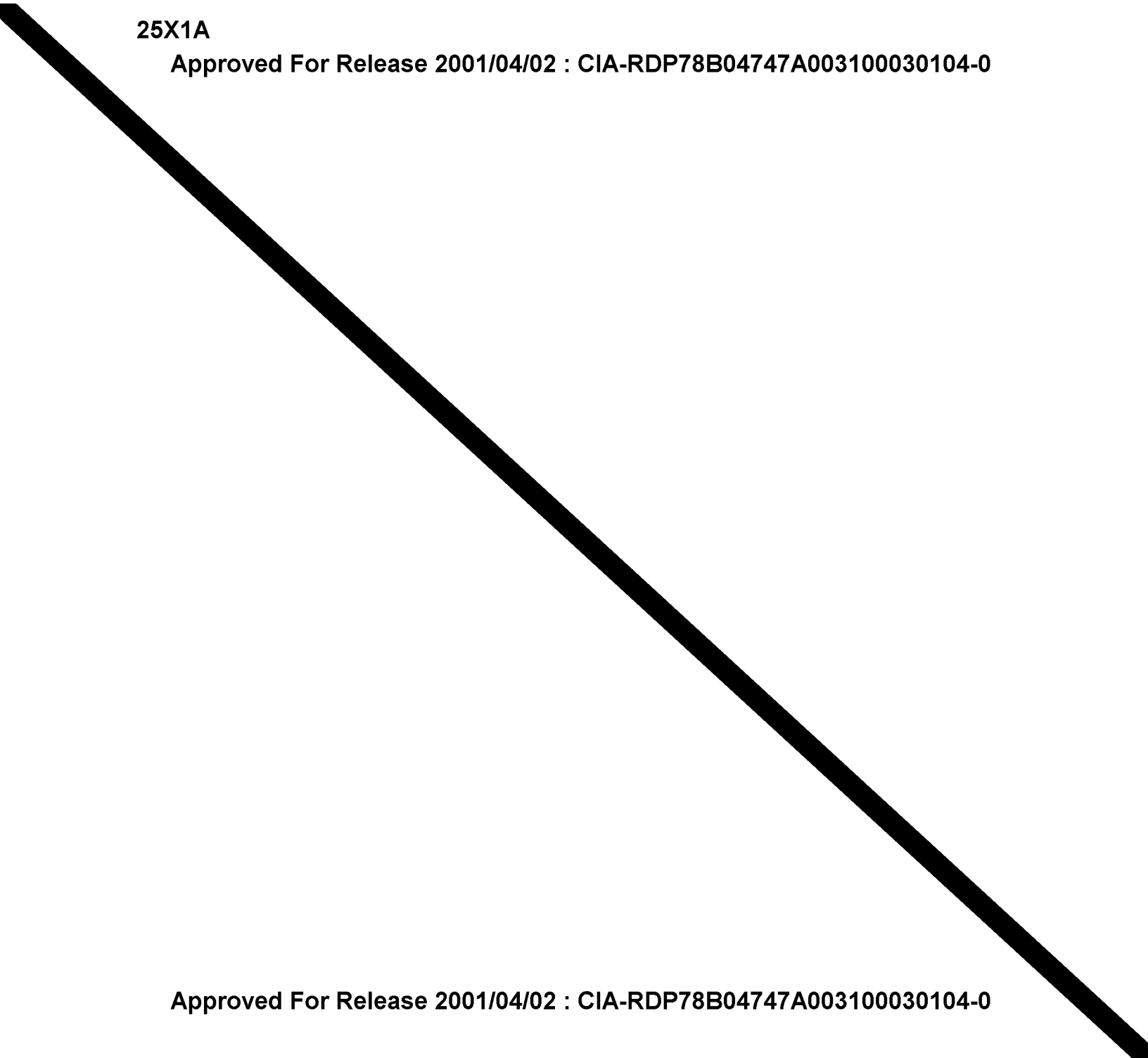
It is recommended that the [redacted] proposal be approved by the TDC and that the undersigned be appointed as contract monitor.

25X1A [redacted]

Development Branch, P&DS



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STANDARD FORM NO. 64

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TO :

DATE:

FROM : Hold back on this and

SUBJECT: Run experiments on the MK I in house with materials aquired Through [redacted]

STATINTL